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ANTONELLI, TERRY, STOUT & KRAUS, LLP  
1300 NORTH SEVENTEENTH STREET  
SUITE 1800  
ARLINGTON, VA 22209-3873

EXAMINER

CHEN, TIANJIE

ART UNIT PAPER NUMBER

2627

DATE MAILED: 05/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/644,824	<b>Applicant(s)</b> SHIROISHI, YOSHIHIRO	
	<b>Examiner</b> Tianjie Chen	<b>Art Unit</b> 2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 06 March 2006.  
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 4 and 6-23 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 4 and 6-23 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Non-Final Rejection (RCE)***

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/06/2006 has been entered. Claims 4 and 6-23 are pending.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 14-23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 14 and 18 recite "a recording density is more than 5GB/in<sup>2</sup>." Applicant has never disclose that "a recording density is more than 5GB/in<sup>2</sup>" In specification.

Claims 15-17 and 19-23 are rejected for their dependence from claims 14 and 18, respectively.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claim 18 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,404,605. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of US 6,404,605 recites the following features of claim 18 of current Application: a magnetic recording and reading device comprises: a magnetic recording medium having a substrate and a thin magnetic layer formed above the substrate; a magnetic head having a reading head; and a RW-IC; wherein the recording head has an upper magnetic core and a lower magnetic core with a magnetic core length  $l_1$  is not more than  $35\text{ }\mu\text{m}$ ; wherein the reading head has a read element having a track width of not more than  $0.9\text{ }\mu\text{m}$ ; wherein an absolute value of normalized noise coefficient per recording density of the magnetic recording medium is not more than  $2.5 \times 10^{-8}(\mu\text{V}_{\text{rms}})(\text{inch})^{0.5}/(\mu\text{V}_{\text{pp}})$ ; and wherein a data transfer rate of the device is more than 50MB/s, and a recording density is more than 5Gb/in<sup>2</sup>.

Claim 1 in US 6,404,605 does not specify a recording head. However, the third paragraph in claim 1 in US 6,404,605 is obviously describing a recording head.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 4, 7, 9, 10, and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crue et al (US 6,043,959) in view of Hong et al (US 6,423,430), Han et al (US 6,024,886), Cai (US 6,191,911), and Sedlmayr et al (US 5,761,166).

Claim 4, 7, and 13, Crue et al shows a magnetic head and teaches that his magnetic head is to be used for writing a high area densities and transferring data at high rates (Column 1, lines 6-8) Hong et al shows a magnetic medium with larger Kerr rotation angle enough to present reliable reproducing characteristics, and also teaches that this medium is used as a recording medium with high data storage density and high data transferring rate. One of ordinary skill in the art would have been motivated to combine these two together to form a magnetic recording and reading device for having reliable reproducing characteristics, high data storage density, and high data transferring rate. The above constructed device includes: a magnetic recording medium having a substrate 11 (Fig. 2 in Hong et al; claim 5) and a magnetic layer formed on the substrate, a magnetic head comprising a recording head having a magnetic core having a magnetic core lengths (yoke length)  $l_1 = 10\text{-}20\text{ }\mu\text{m}$ , which is not more than  $35\text{ }\mu\text{m}$  (Column 12, lines 30-32) made of CoZrNb with inherent resistivity of

Art Unit: 2627

more than  $50\mu\Omega$ , and an inherent R/W-IC; Hong et al shows in claim 2 that the magnetic layer contains (1) Co, (2) Cr, and (3) Gd, which is in an amount not more than 15 atomic % (Hong et al's claim 2).

Crue et al shows a reading head provided with a read element 112 (Fig. 14, column 7, line 65), but does not show that track width

Han et al shows a MR a track width of not more than  $0.9\mu\text{m}$  (Column 7, lines 40-42).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply the track width taught by Han et al into Crue et al's device. The rationale is as follows: Crue et al's device is used for high areal density. It is well known in the art that a narrow track width is important for high areal density recording and reading device. Han teaches a device with narrow track width. One of ordinary skill in the art would have been motivated to use this track width to reach high areal density in recording and reading.

Cai et al shows that at the time the invention was made, magnetic (Column 1, line 19) recording and reading device, which is commercially available, would have storage density of  $2.7\text{GB}/\text{inch}^2 = 21.6\text{Gb}/\text{inch}^2$  (Column 1, lines 27-31). Four years before this Application was filed, Sedlmayr et al shows that a contemporary magnetic (Column 1, line 48) recording and reading device has data rate of  $100\text{MB}/\text{s}$  or more (Column 3, lines 34-35). One of ordinary skill in the art would have been reasonably expecting that the device has density of more than  $5\text{Gb}/\text{in}^2$ .

Claim 9; Hong et al further shows in claim 1, that the magnetic recording medium further comprises a non-magnetic intermediate layer containing Si (Column 4, lines 13-18).

Art Unit: 2627

Claim 10, Hong et al shows that magnetic recording medium has a perpendicular anisotropy magnetic recording layer (Column 2, lines 53-55).

Claim 14, the above constructed device includes a magnetic recording and reading device comprising: a magnetic recording medium having a substrate and a thin magnetic layer formed on the substrate; a magnetic head having a recording head; and a RM-IC; wherein the recording head has an upper magnetic core and a lower magnetic core with a magnetic core length  $l_1$  of not more than 35  $\mu\text{m}$ ; the reading head has a read element having a track width of not more than 0.9  $\mu\text{m}$  the thin magnetic layer includes a magnetic crystal grains containing (1) at least one metal element selected from a first group consisting of Co, Fe and Ni as a primary component, (2) at least two elements selected from a second group consisting of Cr, Mo, W, V, Nb, Ta, Ti, Zr, Hf, Pd, Pt, Rh, Ir and Si, and (3) at least one element selected from a third group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Bi, Sb, Pb, Sn, Ge and B, the at least one element selected from the third group being in an amount of 0.1 to 15 atomic %; a data transfer rate of the device is more than 50MB/s, and a recording density is more than 5Gb/in<sup>2</sup>.

Claim 15, the above constructed device further shows that the  $l_1$  is a length between an air-bearing surface of the magnetic core and a connection, which connects the upper magnetic core with the lower magnetic core.

Claim 16, the above constructed device, further shows that the RW-IC has a line width of not more than 0.35 $\mu\text{m}$ .

Claim 17, the above constructed device further shows that the magnetic recording medium further comprises a non-magnetic intermediate layer containing at

Art Unit: 2627

least one element selected from the group consisting of Cr, Mo, W, Ta, V, Nb, Ta, Zr, Hf, Ti, Ge, Si, Co, Ni, C and B.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crue et al in view of Hong et al and etc. as applied to claim 4 above, and further in view of Linliu et al (US 5,773,199).

In Crue et al's device, there is an inherent R/W-IC, but does not specify the linewidth.

Linliu et al shows a method for forming advanced integrated circuits, electrical element, and patterned layers of linewidth dimension at least as low as about 0.25 microns (Column 3, lines 5-8).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply Linliu's method Crue et al's device. The rationale is as follows: Linliu teaches that there has been a continuing trend towards decreasing linewidth dimensions (Column 1, lines 22-25) of electrical circuit element and patterned layers. One of ordinary skill in the art would have been motivated to apply Linliu's method to decrease linewidth to at least less than 0.25 microns, which is less than 0.235 microns.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crue et al in view of Hong et al and etc. as applied to claim 4 above, and further in view of Shiratori et al (US 6,180,208).

Claim 8, Crue et al shows magnetic layer, but does not show the crystallinity of the layer.



Shiratori et al shows that the magnetic layer in a magneto-optical disk is amorphous (Column 6, lines 16-22). One of ordinary skill in the art would have been motivated to recognize that the magnetic layer in Hong et al's disk is amorphous.

7. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crue et al in view of Hong et al and etc. as applied to claim 4 above, and further in view of Huber (US 6,178,144).

Hong et al shows that the magnetic medium is a magneto-optical recording medium, but does not specify that it has a granular structure.

Huber teaches that conventional magneto-optical medium inherits granular structure (Column 9, lines 43-45). It is also well known in the art, that magneto-optical recording medium has certain kind crystalline structure, and since it is a thin and wide sheet, it can not be a single crystal. Therefore, it must be composed from large number of crystal grains, i.e. it has granular structure. One of ordinary skill in the art would have been expecting that Hong et al's magneto-optical medium also has granular structure.

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crue et al in view of Hong et al and etc. as applied to claim 4 above, and further in view of Yamashida et al(US 6,215,609).

Crue et al and Hong et al do not show that speed of the magnetic disk.

Yamashida et al shows a magnetic hard disk drive (Column 11, line 43-44) with surface density 4GB/in<sup>2</sup>, which is close to Grue et al, Hong wt al, and etc.'s device, operated at a speed of 12000 rpm (Column 11,lines 52-53). It would have been

obvious at the time the invention was made one of ordinary skill in the art would have set the speed at 12,000 rpm. The rationale is as follows: it is well known in the art the higher rpm would lead to higher data rate, which is commonly desired. One of ordinary skill in the art would follow Yamashida et al's teaching to set the speed at 12,000 rpm to obtaining high data rate.

### ***Response to Arguments***

9. Applicant's arguments filed 03/06/2006 have been fully considered but they are not persuasive.

10. Applicant argues that there is not enough reason for combining the references.

- Examiner's position:

- (1) the reason for combining Cure et al and Hong et al has been rewritten and has been made clearer.

- (2) Applicant has emphasized in Summary that his invention is related to a recording medium. And the other portions, such as the magnetic heads and the data transferring rate, are realized by using conventional magnetic heads, such as disclosed in some Japanese patent, and some conventional data transferring approaches, such as EPRML, EEPRML, trellis coding, ECCs etc.. Applicant only uses common sense to combine these features together. Examiner has provided good reasons for combining the references, which is stronger than Applicant's reasons.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tianjie Chen whose telephone number is 571-272-7570. The examiner can normally be reached on 8:00-4:30, Mon-Fri.

Art Unit: 2627

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Nguyen can be reached on 571-272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**TIANJIE CHEN**  
**PRIMARY EXAMINER**